From:	Ken Bird
To:	Butler, Elizabeth
Cc:	Tom Ebbert (ebbert@ppg.com); Feinberg, Richard [C]; Brad Zewe
Subject:	Riverside Industrial Park Superfund Site- Phase 1 Field Modifications
Date:	Tuesday, December 05, 2017 10:17:46 AM
Attachments:	Riverside - Sample Location South.pdf Riverside - Sample Location North.pdf 2017.12.04_Field Modifications Memo.pdf 2017-09-01 CLP MA (ISM02.4) ICPMS Soil+AlCaFeMgKNa r1.docx

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Elizabeth, On behalf of PPG, attached is a memo that summarizes the changes and modifications to the work plan. The figures were previously provided to you.

Ken

Ken Bird, CIH, LSRP
Woodard & Curran
300 Penn Center Blvd, Suite 800
Pittsburgh, PA 15235

Main – 412-241-4500
Office- 412-535-0835

COMMITMENT & INTEGRITY
DRIVE RESULTS

300 Penn Center Blvd. | Suite 800
Pittsburgh, Pennsylvania 15235
www.woodardcurran.com

T 800.883.3266
T 412.241.4500
F 412.241.7500

MEMORANDUM

TO: Elizabeth Butler - USEPA

FROM: Woodard & Curran on behalf of PPG

DATE: December 4, 2017

RE: Modifications to the Riverside Industrial Park Superfund Site Work Plan

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Work Plan and QAPP Modifications

During Phase I activities that were performed at the Riverside Industrial Park Superfund Site between the dates of September 25, 2017 and October 26, 2017, adjustments were made by Woodard & Curran to reflect conditions encountered and/or at U.S. Environmental Protection Agency (USEPA) site representative direction. As noted below, USEPA or USEPA site representative verbal or email consent was obtained. PPG was aware and/or participated in discussions on the changes. The following paragraphs summarize the conditions encountered during specific tasks as well as the changes that were made to meet the objectives of the Work Plan.

Utility Clearance via Hand Augering

Woodard & Curran health and safety (H&S) guidelines are to hand clear any boring location to five feet below ground surface (bgs) during subsurface investigations using either or a combination of hand augers or air knife methods. At the initiation of the field activities, hand clearing of the first borings (Borings B-70 and B-69) was not possible using a hand auger due (i.e., abundance of large pieces of brick, wood, and gravel). auger refusal encountered at less than 1 foot below grade at both locations (i.e., abundance of large pieces of brick, wood, and gravel). Air knife hand clearance was not considered a viable alternative given the objectives of the investigation which includes the collection of a surface soil sample for volatile organic compound (VOC) analysis from the ground surface to a depth of 1 foot and possibly other samples in the top five feet of soil. On-site USEPA staff agreed that an alternate method of sample collection would be needed (i.e., direct push technology [DPT]). The Woodard & Curran H&S Department determined that hand clearing for subsurface utility clearance would be waived given the site conditions, NJ One call mark outs, and recent underground utility line tracing using geophysical methods. NJ One Call policy is to be at least two feet from a utility mark-out when using mechanical equipment.

Hand augering was still performed for the collection of the surface soil samples (0 to 1 foot bgs) where possible, unless after three attempts where refusal was encountered before the initial surface soil sample interval could be collected. If hand augering could not be used to collect the surface soil sample, a decision was made in the field to use the Geoprobe® to collect the initial sample and continue via Geoprobe® to the target depth as planned. There is no specific standard operating procedure (SOP) for utility clearance; therefore, no SOP modification is needed. The soil sampling SOP (SOP S-1 Standard Operating Procedure for Soil Sampling) allows for the collection of soil samples using mechanical methods (e.g., split spoons, DPT), or hand collection techniques (e.g., hand augers, trowels, spoons, etc.) as required by physical characteristics and location of soil. The collection method (hand auger or Geoprobe®) of the surface sample is noted on the boring log.

Ground Surface Sample Interval Determination

During sampling activities, Woodard & Curran field personnel and the USEPA site representative discussed how to appropriately record the surface interval for a sample if the location of the soil boring has a concrete or asphalt surface. Woodard & Curran personnel initially started logging the soil interval

depths immediately below the concrete or asphalt (i.e., if a one-foot layer of concrete was encountered, the soil sample would be labeled 0 – 1' immediately below the concrete with the boring log noting the presence of surficial asphalt/concrete). a request was put forth by the USEPA site representative to use the actual depth of the surface soil sample and recording sample depth from the top of the paved surface. The USEPA site representative preferred the sample depth reflect the presence of non-soil surface material. Woodard & Curran personnel applied the advice of the USEPA site representative and began labeling samples according to their actual depth below grade. The completed field logs were corrected as necessary to reflect this change. Applicable sample IDs were revised with the correct depths on the chain of custodies already submitted to the laboratory. This revision applied to the sample IDs from two borings (B-56 and B-58) which were collected on September 27, 2017. There is no specific SOP that addresses this activity; therefore, no SOP modification is needed.

Geological Logging Changes

During soil sampling procedures, boring logs were created. If low recovery was encountered in any particular five-foot probe run, the Woodard & Curran field geologist would proportion out the recovery over the five-foot run making some interpretation of what sample was recovered based observations during that core run and the subsequent five-foot core run. This was allowing for a continuous boring log to be produced with no zones designated on the boring log to be listed as "no recovery". After discussions with the USEPA site representative regarding the procedure used to log no recovery zones, the site representative suggested using a different technique. This new logging technique would only log what was actually recovered, therefore, the field geologist would not have to make an interpretation (i.e., if three feet was recovered from an interval that went from the surface to 5 feet bgs, the boring log would show the surface to 3 feet bgs as logged material with a description and the remaining two feet of the core run would be listed on the log as "No Recovery"). Woodard & Curran field geologists changed their logging method to conform to the technique requested by the USEPA site representative. There is no specific SOP that addresses this activity; therefore, no SOP modification is needed. Phase 1 boring logs reflect this logging procedure.

TWP and Soil Boring Location Adjustments or Additions

During the soil sampling and temporary well point (TWP) installation phase of the project, certain borings were not able to be completed at the Work Plan locations due to the presence of underground utilities identified by the geophysical methods. Additionally, some samples were unable to be collected because of either subsurface structures being encountered that produced refusal, or the material that was to be sampled was saturated and not sampled. Below is a summary of the breakdown of points that were not sampled due to soil saturation or poor recovery, and points that encountered refusal and could not be advanced and were either abandoned or TWPs were shifted to another nearby location that could be accessed.

Soil Boring Location Adjustments

An underground utility tracing survey was conducted at the site to clear utilities prior to the soil boring program. Some of the boring locations identified in the Work Plan were in conflict with the identified underground utilities. Generally, borings were moved up to 3 feet away from the original location in order to conduct the boring safely without impacting underground utilities. During an on-site discussion between the USEPA and Woodard & Curran personnel on September 26, 2017, Woodard & Curran personnel received the approval from the USEPA to shift soil borings as necessary to avoid interferences with subsurface lines/utilities at their discretion. As a courtesy, boring location changes were discussed with the USEPA site representative as the soil boring program was implemented. The table below references, why the adjustment of the original proposed boring location was needed, and new coordinates. The following paragraphs will also describe the conflict and the resolution that was taken with each point in

more detail. PPG was aware that boring locations were being changed due to underground interferences, unsafe conditions, or surface obstructions.

Boring	Easting	Northing	Adjustment Note
2	586364.86	704262.98	Concrete Refusal
3	586320.48	704228.07	Wall Collapsing
4	586417.13	704265.69	Underground Utilities
5	586484.65	704436.10	Underground Utilities
6	586655.17	704505.25	Concrete Loading Dock
7	586730.32	704514.84	Underground Utilities
8	586753.93	704504.27	Underground Utilities
15	586674.29	704571.58	Wall Collapse
22	586617.69	704237.26	Underground Utilities
26	586551.75	704164.14	Underground Utilities
27	586573.16	704209.24	Underground Utilities
29	586468.05	704068.68	Underground Utilities
30	586545.96	704038.76	Underground Utilities
34	586441.61	704095.76	UST/Underground Utilities
39	586230.26	704000.66	Underground Utilities
40	586279.19	704016.56	Underground Utility
41	586292.87	704015.33	Concrete/Underground Utility
61	586832.95	704722.69	Underground Utility
62	586865.22	704721.44	Underground Utility
63	586897.75	704675.35	Underground Utility/ Vegetation
69	586405.05	703994.43	Underground Utilities
70	586414.64	704015.17	Underground Utilities/Fence
72	586644.26	704348.51	Tractor Trailer Parked Immovable
75	586499.84	704100.60	Underground Utilities
DF-5	586726.50	704338.91	Concrete/Underground Utilities
HP-FL2	586791.34	704763.97	Utility Line/Vegetation
HP-RR2	586285.19	704141.20	Collapsed Brick
HP-RR3	586720.41	704519.04	Underground Utility Tractor Trailers

Coordinate System: NAD 1983 State Plane New Jersey (US Survey Feet)

The following bullets describe the reasoning used and/or solution to the above listed conflicts, and the points were shifted greater than 3 feet away from their original location.

- **B-2** – The initial shift of B-2 location was influenced by a gas line that ran directly underneath where B-2 was supposed to be placed. Another influencing factor was the leaning wall that surrounded the impound structure and was leaning on the western side. The vibrations from the rig could have caused the wall to collapse and even though the wall most likely would have collapsed toward the rail line to the west away from the impound, the splash zone from the collapsing brick could still affect the B-2 location. It was deemed an unsafe location. The B-2 new location was agreed upon by the USEPA in an email dated October 23, 2017, titled re-location of B2 and B3.
- **B-3** – The western wall to the impound structure was leaning toward B-3, and if the wall would have collapsed, it would have landed on the crew performing the drilling activities. The point was deemed not safe and shifted further south along the rail line outside of the collapsing walls footprint. B-3 new location was agreed upon by the USEPA in an email dated October 23, 2017, titled re-location of B2 and B3.

- **B-4** – The location for B-4 was shifted due to underground utilities lines running in close proximity to the original location. There was a gas line and water line in close proximity to its original location.
- **B-5** – An underground telecommunications line ran in close proximity to the original boring location. It was shifted to avoid striking the communications line during drilling activities.
- **B-6** – This boring location was located on a loading dock ramp which frequently had big rig trailers parked on it. According to site tenants, the trailers could not be moved. The concrete ramp was at least two inches thick at the original location of B-6. The boring was shifted to the west to the base of the ramp so the concrete ramp could be avoided along with the tractor trailer traffic.
- **B-7** – An unknown underground line as well as a sewer sanitation line ran within close proximity to the original location so B-7 was shifted away from Building #10 toward the north to avoid the underground lines.
- **B-8** – An unknown underground line ran within close proximity to the original location so the point was shifted away from Building #10 toward the north to avoid the underground line.
- **B-15** – This boring was located to the eastern side of Building #15. Boring B-15 was shifted because it was in close proximity to an unstable concrete block/brick wall. The wall surrounded the former aboveground storage tanks (ASTs) located within Building #15. Due to the vibrations that can be created from the Geoprobe® sampling, it was deemed unsafe by Woodard & Curran personnel to drill that close to the wall, and the boring was shifted away from it.
- **B-22** – This boring was shifted to avoid an underground gas line that ran in close proximity to the original boring location.
- **B-26** – This boring was shifted to avoid a water line and an unknown utility line that ran between Buildings #9 and #6. The lines run within close proximity to the original boring location.
- **B-27** – This boring was shifted to avoid an underground gas line, water line and an unknown utility line that run between Buildings #9 and #6. The lines run within close proximity to the original boring location.
- **B-29** – An unknown line identified by geophysical survey traversed within close proximity to the original boring location. The boring was shifted to avoid contacting the unknown underground line.
- **B-30** – Two unknown lines (identified by geophysical survey) were located that ran from the bulkhead area west toward Building #7 within close proximity to the original boring location.
- **B-34** –The original location of Boring B-34 was directly above an underground storage tank (UST) within the tank field and also had a water line and unknown underground line identified by geophysical survey run within close proximity to it as well. It was discussed between USEPA and Woodard & Curran field personnel to move the point location, and the new location was agreed upon in the field.
- **B-39** – A gas line ran within close proximity to this boring's location and it was shifted in the field to avoid the gas line.
- **B-40** – An unknown underground line (identified by geophysical survey) was in close proximity to this boring location. The boring was shifted to avoid the line.
- **B-41** – An unknown underground line (identified by geophysical survey) was in close proximity to this boring location, and a thick concrete slab was encountered during the first two attempts

to sample this boring location. The boring was shifted to avoid the line as well as the slab so that a sample was able to be collected.

- **B-61** – An unknown unground line identified by geophysical survey ran in close proximity to this boring location so the point was shifted north to avoid the line.
- **B-62** – A gas line ran in close proximity to the original boring location. The boring was shifted southward to avoid the gas line.
- **B-63** – The boring was shifted due to a gas line that ran in close proximity to the original location and heavy vegetation.
- **B-69** – An unknown underground line identified by geophysical survey as well as a water line lay in close proximity to this boring location. The location was shifted toward the west (direction of Building #12) to avoid hitting either line. This point was adjusted at the Site by Woodard & Curran personnel with USEPA site representative input.
- **B-70** – An unknown underground line identified by geophysical survey as well as a water line lay in close proximity to this boring location. The location was shifted toward the west (direction of Building #12) to avoid hitting either line. Also, a new security fence was installed directly where this point was to be located so it was shifted slightly north to avoid the fence. This point was adjusted in the field by Woodard & Curran personnel with USEPA site representative input.
- **B-72** – This boring was adjusted due to its original location being covered by immovable truck trailers. The property owners were informed of the original borings location, however, they informed Woodard & Curran personnel that the trailers were immovable. Woodard & Curran field personnel, with USEPA site representative input, located a position that was accessible and close to the original location.
- **B-75** – A water line and unknown underground line (identified by geophysical survey) ran in close proximity to this boring's location. The decision was made in the field by Woodard & Curran personnel to shift the point to the south, away from where the water line.
- **DF-5** – Was located on the solid surface bulk head and a decision was made to slightly shift it away from a concrete vault that held a gas line and off into a soil patch nearby.
- **HP-FL2** – A gas line ran along the property boundary in close proximity to this point, and there was heavy vegetation within this area, therefore, the location was moved.
- **HP-RR2** – Large quantities of brick from a collapsed wall had fallen onto the tracks at this location. There was an effort to move as much of the brick as possible to obtain the exact location, however, directly over the point was a large mass of brick so the point was slightly shifted to the east to a clear location.
- **HP-RR3** – During sampling activities, a tractor trailer was parked and the point had to be shifted in order to collect a sample. There was also a sewer and sanitation and unknown line identified by geophysical survey that ran through this area as well under the original boring location.

TWP Location Adjustments

- **B-2** – At Boring B-2, refusal was encountered due to thickness of the concrete slab and the presence of rebar, which prevented sampling. The concrete slab is at least 18 inches thick at the B-2 location, however, at the B-1 location, concrete was still encountered at 27 inches. Three unsuccessful attempts were made to get through the concrete, and a determination was made not collect samples at B-2. Boring B-78 was added as a replacement boring for both B-1 and B-2 (see replacement borings section).

- **B-9** – Boring B-9 was designated as a soil boring location initially, but after refusal was encountered at point B-71, Boring B-9 was converted into its replacement TWP.
- **B-10** – At Boring B-10, a void space was encountered underneath of the concrete pavement that is located at this boring. Only one soil sample was collected with USEPA consultation due the void space. Proposed TWP at B-10 was shifted to adjacent soil boring location B-11.
- **B-11** – Due to conditions encountered at B-10, B-11 was installed as a TWP. No soil sample was collected from B-11 due to saturation of the soils below the concrete bulkhead void.
- **B-20** – Boring B-20 was designated as a soil boring location initially but was converted to a TWP point after refusal was encountered at B-72. B-20 became the replacement TWP for B-72.
- **B-50** – Boring B-50 was located within an AST courtyard on the southern side of Building #17. Within this courtyard, the reinforced concrete was too thick and had too much rebar present for the coring machine to get through. A total of three attempts was made to breach the concrete with the deepest attempt reaching 12 inches. B-50 was abandoned, and the TWP was shifted to adjacent point B-51.
- **B-5**1 – Due to conditions encountered at B-50, Boring B-51 was converted into a TWP installation point, USEPA gave verbal agreement over the phone on October 26, 2017.
- **B-68** – Boring B-68 was designated as a soil boring location initially, but after refusal was encountered at TWP B-73, boring B-68 was converted into its replacement TWP location.
- **B-71** – The TWP for B-71 was unable to be installed at the B-71 location. Refusal was encountered at approximately five feet below grade on the concrete bulkhead. One soil sample was collected from this location, however the TWP was not installed but instead shifted to Boring B-9 where it was installed as a replacement TWP for B-71.
- **B-72** – Boring B-72 encountered refusal at approximately 5 feet bgs, therefore, the TWP was unable to be installed at this location and was placed in B-20 as a replacement TWP for B-72.
- **B-73** – At TWP B-73 location, a smaller cart Geoprobe® rig was used to attempt to advance the TWP due to access constraints to the interior of the building (Building #6). The smaller rig, however, could not penetrate further below the ground than 5 feet bgs at this location. The TWP was shifted to Boring B-68 which is located within the same building pad as B-73. The cart rig was able to advance to the desired placement depth to put in a TWP at this location (B-68). This was also done with agreement between the USEPA and Woodard & Curran personnel.

Soil Boring Abandonments due to Refusal or Soil Saturation

- **B-1** – Boring B-1 was located within a walled basement to the south side of Building #3. Three attempts were made to advance B-1 through the concrete floor, however no attempt proved successful. The concrete was found to be at least 27 inches thick. It was determined by Woodard & Curran field personnel and USEPA site representative to abandon the B-1 location (no soil samples collected).
- **B-2** – See previous section “Temporary Well Point Location Adjustment”.
- **B-45** – Soil samples recovered from below the basement floor in Building #17 at location B-45 were saturated, there for no soil samples were collected from this location.
- **B-46** – Due to soil saturation below the concrete basement floor at adjacent soil boring locations B-45, B-47, and B-49, the determination was made to not sample this boring location.
- **B-47** – Soil samples recovered from below the basement floor in Building #17 at location B-47 were saturated, therefore, no soil samples were collected from this location.

- **B-48** – Due to soil saturation below the concrete basement floor at adjacent soil boring locations B-45, B-47, and B-49, the determination was made to not sample this boring location.
- **B-49** – Soil samples recovered from below the basement floor in Building #17 at location B-49 were saturated, therefore, no soil samples were collected from this location.

Borings B-45, B-46, B-47, B-48, and B-49 are located in the basement of Building #17 which is located adjacent to the river. Woodard & Curran field personnel attempted to collect a sample from B-49 only to find that immediately below the concrete basement floor groundwater had saturated the soils. USEPA site representative suggested to make an attempt to collect a soil sample from B-47, which is located more distant from the river and that if saturated conditions were found immediately beneath the concrete, it would be safe to assume that the remainder of the interior basement borings in Building #17 were saturated. Saturated conditions were found immediately below the concrete at B-47. Woodard & Curran office personnel suggested to USEPA and Woodard & Curran field personnel to attempt one more additional boring located in the northeastern corner of Building #17 closest to the river (B-45), and if that point location is saturated then the assumption could be made that the two most central borings, B-46 and B-48, would be saturated and those borings could not be sampled. This suggestion was made during a weekly telephone conference call between the USEPA, Woodard & Curran personnel and PPG. It was agreed that this would be a better way to proceed to determine if B-46 and B-48 could be sampled. When B-45 was completed, it was found to be saturated beneath the concrete, and both B-46 and B-48 soil borings were not sampled, as agreed upon in an October 20, 2017 USEPA email.

Additional Soil Borings

- **B-78** – Because no soil samples were collected from the basement of Building #17, B-78 was added as a replacement boring. B-78 was a boundary boring located to the north of a loading dock on the exterior of Building #17.
- **B-79** – B-79 was completed on the east side of the former AST area because no samples were collected from within the former AST area (B-1 and B-2). This point was proposed and verbally agreed upon (via telephone) by USEPA, PPG and Woodard & Curran.

Additional TWPs

Three of the five contingent TWPs identified in the Work Plan were installed at Borings B-30, B-70, and B-75. TWPs were placed at Borings B-70 and B-75 based on elevated soil headspace photoionization detection (PID) readings. A TWP was placed at B-30 in part due to elevated soil headspace PID readings but primarily due to its inferred downgradient location from B-75 and B-34 and was agreed upon verbally by USEPA on October 26, 2017.

TWP Installation Adjustments

Initially, SOP S-22 stated that TWPs would be advanced within a core barrel of sufficient size so that the polyvinyl chloride (PVC) riser and screen could be set at the appropriate depth within them. The core barrel would then be withdrawn and filter pack sand would be added to the boring so that it would extend above the groundwater contact. After Woodard & Curran field personnel had completed Borings B-42 and B-44 in the same manner, the USEPA site representative stated that it would probably be better to drive a larger diameter core barrel (i.e., 3-inch) at TWP locations so that sand could be added into the annulus space within the core barrel and outside of the PVC riser and screen to make sure that the sand pack actually reaches to the desired depth below surface to provide a filter for the TWPs screen. Woodard & Curran staff agreed that they would proceed with the three-inch core barrel and sand pack for the remaining TWP locations, as feasible. The TWPs that were installed with the 3-inch core barrel are as follows: B-7, B-9, B-11, B-13, B-18, B-20, B-28, B-30, B-31, B-32, B-34, B-38, B-39, B-51, B-55, B-57, B-59, B-61, B-63, B-67, B-70, and B-75.

TWPs installed using the proposed method in SOP S-22 are as follows: B-42, B-44, and B-68. B-68 was installed using the original method because the rig did not have sufficient drive force to push the 3-inch steel casing. The cart rig was used since access to the boring location was limited within Building #6. Below is a table summarizing the Geoprobe® casing diameter used during the TWP installations as well as if it was sampled immediately following purging or allowed to wait for 24 hours. If the core barrel used is listed as standard, the PVC screen was placed at the target depth within a 2-inch diameter core barrel. The core barrel was then retracted leaving the screen within the boring annulus, and filter pack sand was added around the PVC screen in the annulus of the boring. PPG was in agreement with the TWP changes.

TWP ID	Standard or 3-inch Core Barrel	When Sampled
B-7	3	Well went dry during purging, allowed to recharge 24-hour wait
B-9	3	Sampled immediately following development
B-11	3	Sampled immediately following development
B-13	3	Sampled immediately following development
B-18	3	Sampled immediately following development
B-20	3	Sampled immediately following development
B-28	3	Sampled immediately following development
B-30	3	Sampled immediately following development
B-31	3	Sampled immediately following development
B-32	3	Min. 24-hour wait
B-34	3	Sampled immediately following development
B-38	3	Sampled immediately following development
B-39	3	Min. 24-hour wait
B-42	Standard	Min. 24-hour wait
B-44	Standard	Min. 24-hour wait
B-51	3	Sampled immediately following development
B-55	3	Min. 24-hour wait
B-57	3	Min. 24-hour wait
B-59	3	Min. 24-hour wait
B-61	3	Sampled immediately following development
B-63	3	Sampled immediately following development
B-67	3	Sampled immediately following development
B-68	Standard	Sampled immediately following development
B-70	3	Sampled immediately following development
B-75	3	Sampled immediately following development

TWP Sampling Procedural Changes

SOP S-22 states that TWPs were to wait 24 hours prior to the start of groundwater sampling, but must be developed immediately after installation until the parameters reach stabilization or 10 well volumes are removed or whichever comes first. TWPs that were developed immediately after installation and then allowed to sit for 24 hours are as follows: B-32, B-39, B-42, B-44, B-57, and B-59. Due to turbidity changes during the 24-hour wait period at these locations, the USEPA site representative suggested that the 24-hour waiting period be waived for the remaining TWPs with sampling to occur immediately following the development process. This was discussed between Woodard & Curran field personnel, USEPA site and office representatives, as well as Woodard & Curran office representatives, and it was agreed that the 24-hour wait before sampling would be waived and sampling could commence immediately following development. The remaining 17 TWPs were sampled immediately following the development with the

exception of B-7 which was the only TWP to go dry during development. TWP B-7 was allowed to recharge for 24 hours and sampling was commenced after the 24-hour wait period. PPG was made aware of the USEPA requested change.

On October 16, 2017, the USEPA site representative suggested to Woodard & Curran field personnel over a phone call to use a larger diameter ¾-inch bailer instead of the 5/8-inch diameter bailer to collect the VOC samples from remaining TWP to reduce the risk of increasing turbidity readings while the samples were being collected from repeated bailer deployment and retrieval. The following table identifies the 12 TWP locations where VOC samples were collected using the ¾-inch diameter bailer:

- TWP, B-7
- TWP, B-9
- TWP, B-11
- TWP, B-20
- TWP, B-31
- TWP, B-28
- TWP, B-34
- TWP, B-68
- TWP, B-75
- TWP, B-70
- TWP, B-51
- TWP, B-30

The revised SOP S-22 is attached that incorporates the TWP installation adjustments and procedural changes for sampling.

Soil Sample Labeling from Borings

According to Quality Assurance Project Plan WS#27.5, soil samples collected from soil borings were to be labeled as follows:

- sample prefix “SS” or “SB”;
- followed by a unique number;
- followed by a sample location identifier (e.g., Lot 1); and
- followed by the depth of the sample in parenthesis at the end sample identification.

Naming performed during the soil boring program was conducted as follows:

- sample prefix “B” or “SB”;
- followed by a unique sample location identifier number;
- followed by the depth of the sample in parenthesis or (Fill) if collected from an above grade soil mound; and
- followed by the date of sample collection in parenthesis at the end sample identification in month/day/year format (e.g., _100317).

Select Metal Analysis Method (Soil Samples)

The analytical method was modified for aluminum, calcium, iron, magnesium, potassium, and sodium per attachment.

DELIVERABLE MODIFICATIONS

USEPA agreed (November 1, 2017 email) that hardcopies of the laboratory reports would not be required to be submitted to USEPA.

SOP S-22

STANDARD OPERATING PROCEDURE FOR TEMPORARY WELL POINT INSTALLATION, SAMPLING, and ABANDONMENT PROCESS

Woodard & Curran, Inc.

TEMPORARY MONITORING WELL INSTALLATION

Temporary well points will be installed to collect groundwater samples for screening purposes. These groundwater samples will be used to determine the groundwater quality within certain areas across the site and the data will be used to determine the placement of new groundwater monitoring wells. Temporary well points will be installed by a New Jersey licensed well driller.

Equipment Needed

- Direct-push drilling equipment, drilling depth, and other project requirements.
- Threaded flush-joint riser pipe of an approved material polyvinyl chloride (PVC) **(NOTE: No glues are permitted.)**
- Threaded flush-joint slotted screen of an approved material PVC, **(NOTE: No glues are permitted.)**
- Clean sand for filter pack.
- Photoionization detector.
- Steel plating for surface protection (if needed).
- Personal protective clothing and equipment as required in the site-specific HASP.
- Weighted measuring tape and/or an electronic water-level meter.

Installation Procedure

The advancement of select soil borings via direct-push methods will be completed per SOP S-1. Select soil borings installed using direct-push methods will be converted to temporary well points. Materials generated during boring and well point installation activities should be managed in accordance with the site-specific management plan. The following steps will be followed when installing temporary well points using direct-push methods:

1. Advance the borehole to the required depth using a coring barrel of a diameter sufficient to allow for insertion of a one inch diameter PVC riser pipe and screen. The borehole locations for the temporary well points should be drilled at least five feet into the groundwater column based on field observations. The final completion depth should be sounded with a decontaminated, weighted tape before continuance of temporary well point placement. A direct-push expendable point may be used to ensure correct depth of well point casing placement.
2. Withdraw the drill rods and check the borehole depth with a weighted tape.
3. Lower the PVC casing string into the three-inch probe casing.
4. After the PVC riser and screen are placed within the three-inch casing, with the screen straddling the groundwater contact. Place filter pack sand around the PVC screen within the steel casing while slowly pulling the steel casing out of the boring. The filter pack should be installed till it extends above the

groundwater contact. The filter pack will be exposed to the formation as the steel casing is withdrawn ensuring that an even filter pack is placed around the PVC screen and riser.

5. Depending on the amount of area activities/traffic, the temporary well point may be marked by a cone or covered with a steel plate until the well point is sampled.
6. Record the appropriate construction/completion information in the field logbook and on the appropriate well installation form.
7. The well identification should be marked on the exterior of the well casing.
8. Direct-push sampling equipment coming in contact with the soil will be decontaminated prior to use and between sampling locations per SOP S-16.

TEMPORARY WELL POINT DEVELOPMENT AND SAMPLING

Temporary well points will be developed by purging three well volumes prior to sampling. The purging step will aide in removing the skin (i.e., near-well-bore formation damage), to settle and remove fines from the filter pack, and to restore/improve the hydraulic connection between the well and the aquifer.

Equipment Needed

- Peristaltic pump.
- Teflon disposable bailer (< 1" diameter)
- Electronic water-level meter.
- Temperature, conductivity, pH meters, and turbidity meter.
- Personnel protective equipment as specified in the site-specific HASP.
- Decontamination supplies.
- Disposal drums for IDW.
- Well purging form or log book, and water sample collection report.
- Teflon-lined poly tubing (1/4" outside diameter OD).
- Appropriate sampling bottleware.

Procedure

The following steps will be followed when developing / sampling the temporary well points:

1. Put on personal protective clothing and equipment as specified in the site-specific HASP.
2. Remove the protective cone or steel plate from over top of the temporary wellhead (if present).
3. Determine the depth to static water level and depth to bottom of the casing by using the electronic water level meter.

4. Calculate out one well volume, three well volumes will need to be purged from the well prior to collecting the appropriate samples. Additional well volumes may be removed at the discretion of the field sampling personnel if improvements in turbidity appear possible but no more than ten well volumes will be removed as part of development.
5. Record field measurements of pH, specific conductance, and turbidity for each well volume removed.
6. Prepare the necessary equipment for the purging / developing of the well. The term developing in this instance is interchangeable with the purging of the well. All temporary well points will have at least three well volumes removed unless the well runs dry. If the temporary well point goes dry prior to removing three well volumes, the purging/development phase will be considered completed and the well will be allowed to recover for a minimum of 24 hours prior to sample collection.
7. Place the peristaltic pump near the well and insert a piece of ¼" Teflon lined tubing. The tubing should extend to the base of the well to ensure that all water is removed from within the temporary well, and water is pulled through the entirety of the sand-pack.
8. Place a piece of surgical tubing (c-flex or like material) over the end of the ¼" Teflon lined tubing and feed the surgical tubing through the peristaltic mechanism on the pump.
9. Begin purging of the temporary well point.
10. After well development is complete the well can be sampled. The Teflon lined tubing, dedicated to each well, will be removed and placed in a re-sealable bag following development. Well points may be sampled immediately after development.
11. A grab groundwater sample for VOC analysis will be obtained from the temporary well point using a disposable bailer. After the VOC sample is collected, reinstall the dedicated Teflon lined tubing and continue collecting samples for the other project specific analyses using the peristaltic pump. The sequence of sample collection is as follows:

    a. VOCs – using a ¾" Teflon lined bailer
    b. SVOCs – using a peristaltic pump
    c. PCBs – using a peristaltic pump
    d. Metals – using a peristaltic pump

    Record field measurement of pH, specific conductance, and turbidity for sample after the bottle ware for the sample has been filled.
12. After sampling is complete, remove the tubing used from the well and dispose of the tubing in appropriate location.
13. Secure the well point, as needed, before moving on to next well point sampling location, unless the temporary well is to be abandoned immediately after sampling. Dispose of produced water as required by the project work plan.

TEMPORARY WELL POINT ABANDONMENT

After sampling of the temporary well point is completed, each location will be abandoned in a timely fashion. The following section describes the basic equipment needed to abandon each point and the process by which the points will be abandoned.

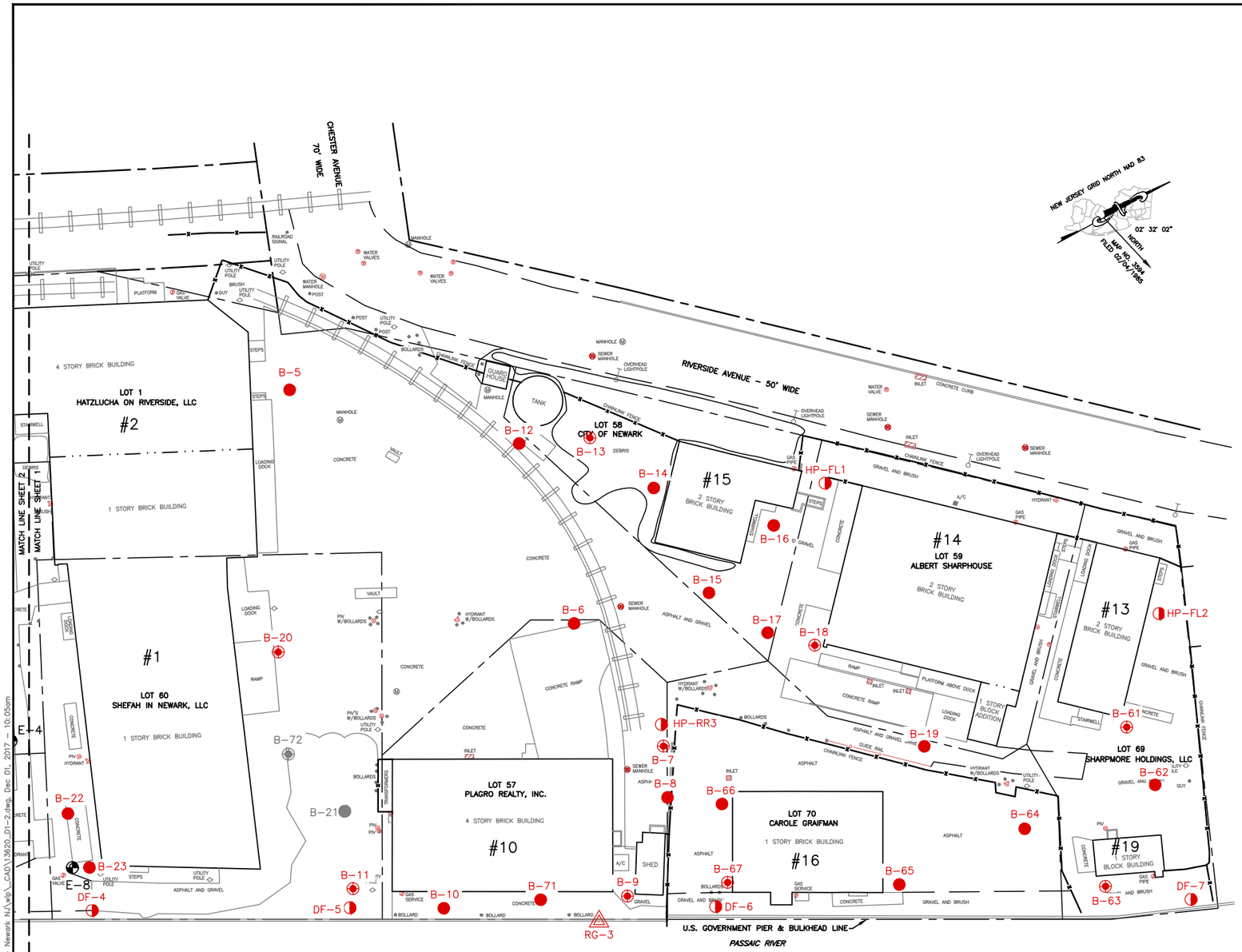
Equipment Needed

- Drilling rig unit, or hoist system
- Bentonite chips or like material
- Field log book or Field Activity Report sheet to document procedure.

Procedure

The following steps will be followed when abandoning the temporary well points:

1. Maneuver the rig or hoist over the temporary well location.
2. Hook the drilling rig's winch system or stand-alone hoist system low to the PVC temporary point.
3. Slowly apply pressure to pull the PVC out of the ground using the hoist system or winch, note temporary well points may also be removed by hand if the formation is not sealed tightly around them.
4. After PVC is removed, the boring shall be backfilled with bentonite chips or other like material.
5. At the surface, the boring location shall be patched with like material, i.e. asphalt in asphalt parking lot, or concrete in concrete or soil/bentonite chips in native material.
6. Tamp the surface to ensure that the backfill material is settled properly into the boring.



LEGEND:

- BOUNDARY LINE
- FENCE LINE
- BUILDING
- #17 BUILDING NUMBER
- E-1 EXISTING MONITORING WELL LOCATION
- B-35 SOIL BORING LOCATION
- DF-1 SURFACE SAMPLE LOCATION
- B-53 SOIL BORING AND TEMPORARY WELL POINT LOCATION
- B-46 SOIL BORING LOCATION – NO SAMPLE COLLECTED DUE TO REFUSAL OR SATURATION OF SOIL
- B-50 SOIL BORING AND TEMPORARY WELL POINT LOCATION NO SAMPLE COLLECTED DUE TO REFUSAL OR SATURATION OF SOIL
- RG-1 PROPOSED RIVER GAUGE LOCATION

NOTE:

1. BORING B-11 WAS CONVERTED TO A TEMPORARY WELL POINT LOCATION; NO SOIL SAMPLE COLLECTED DUE TO SATURATION.
2. ON BORINGS B-10, B-68 & B-71 ONLY ONE SOIL SAMPLING INTERVAL WAS COLLECTED. THE SECOND SOIL SAMPLING INTERVAL ENCOUNTERED REFUSAL OR SOIL SATURATION
3. BORINGS B-78 AND B-79, TEMPORARY WELL POINTS B-30, B-70, AND B-75 ADDED TO WORK PLAN SCOPE WITH EPA CONSULTATION
4. TEMPORARY WELL POINTS B-9 REPLACED B-71, B-20 REPLACED B-72, B-51 REPLACED B-50, AND B-68 REPLACED B-73 WITH EPA CONSULTATION.

WOODARD & CURRAN
300 Penn Center Blvd., Suite 800
Pittsburgh, Pennsylvania 15235
800.883.3266 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
1	ADD BLD NUMBERS AND BORINGS	4/6/17
2	ADJUST LOCATIONS - FIELD CHANGES	11/1/17

DESIGNED BY: ---
DRAWN BY: D.J.M.
CHECKED BY: B.T.Z.
13620_D1-2.dwg

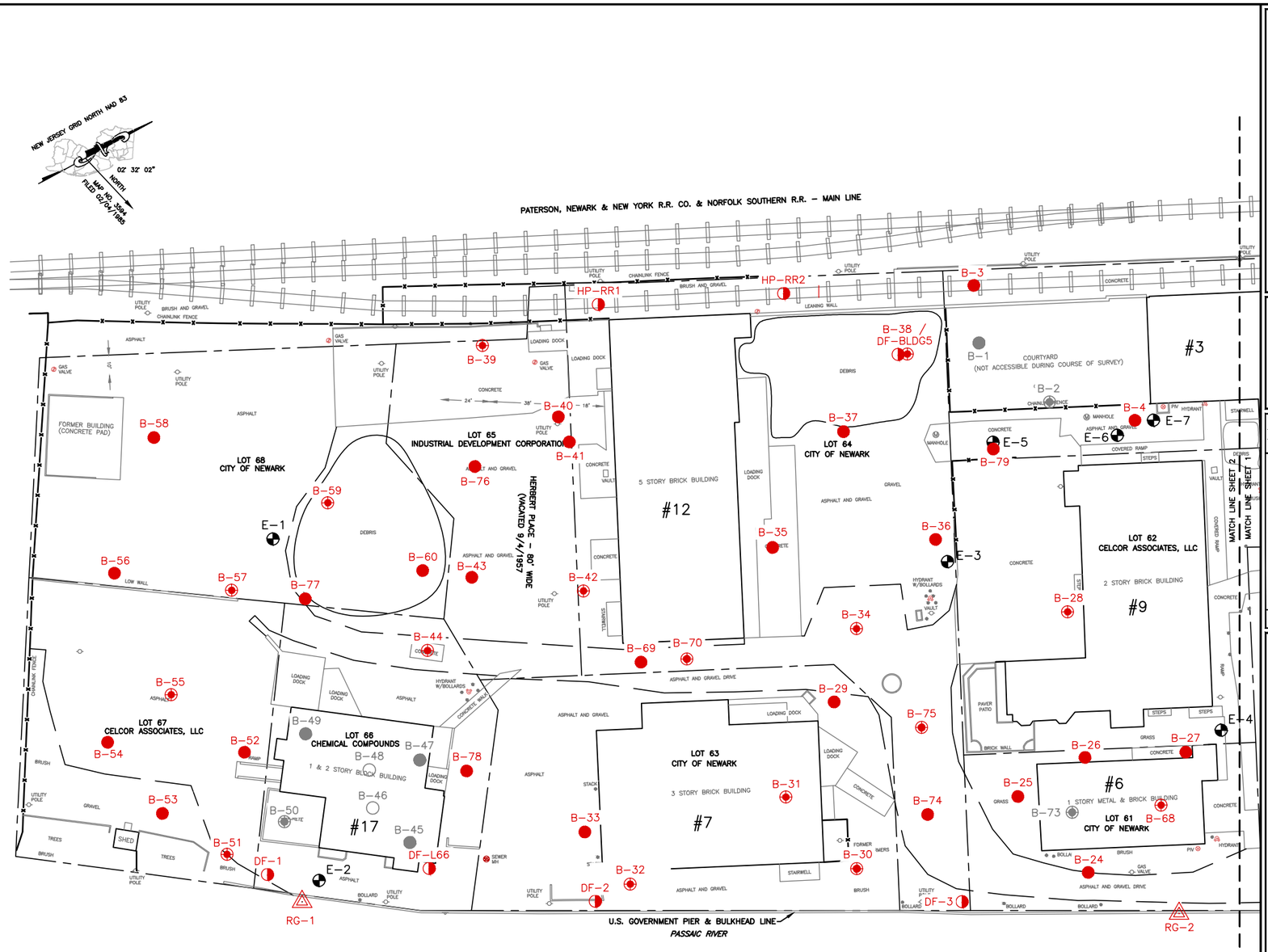
MONITORING WELL / SOIL BORING / SAMPLE LOCATION MAP NORTH

RIVERSIDE INDUSTRIAL PARK
SUPERFUND SITE
EPA ID: NJSFN0204232
TAX BLOCK 614

PPG INDUSTRIES, INC.
NEWARK, NEW JERSEY

JOB NO.:	013620
DATE:	05-16-16
SCALE:	1" = 30'
SHEET:	OF

FIGURE 6-1



LEGEND:

- BOUNDARY LINE
- FENCE LINE
- BUILDING
- #17 BUILDING NUMBER
- E–1 EXISTING MONITORING WELL LOCATION
- B–35 SOIL BORING LOCATION
- DF–1 SURFACE SAMPLE LOCATION
- B–53 SOIL BORING AND TEMPORARY WELL POINT LOCATION
- B–46 SOIL BORING LOCATION – NO SAMPLE COLLECTED DUE TO REFUSAL OR SATURATION OF SOIL
- B–50 SOIL BORING AND TEMPORARY WELL POINT LOCATION NO SAMPLE COLLECTED DUE TO REFUSAL OR SATURATION OF SOIL
- B–46 SOIL BORING NOT CONDUCTED
- RG–1 PROPOSED RIVER GAUGE LOCATION

NOTE:

1. BORING B–11 WAS CONVERTED TO A TEMPORARY WELL POINT LOCATION; NO SOIL SAMPLE COLLECTED DUE TO SATURATION.
2. ON BORINGS B–10, B–68 & B–71 ONLY ONE SOIL SAMPLING INTERVAL WAS COLLECTED. THE SECOND SOIL SAMPLING INTERVAL ENCOUNTERED REFUSAL OR SOIL SATURATION
3. BORINGS B–78 AND B–79, TEMPORARY WELL POINTS B–30, B–70, AND B–75 ADDED TO WORK PLAN SCOPE WITH EPA CONSULTATION
4. TEMPORARY WELL POINTS B–9 REPLACED B–71, B–20 REPLACED B–72, B–51 REPLACED B–50, AND B–68 REPLACED B–73 WITH EPA CONSULTATION.

SCALE
0 15 30 FEET

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Pittsburgh, Pennsylvania 15235
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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
1	ADD BLD NUMBERS AND BORINGS	4/6/17
2	ADJUST LOCATIONS – FIELD CHANGES	11/1/17

DESIGNED BY: ---
DRAWN BY: D.J.M.
CHECKED BY: B.T.Z.
13620_D1-2.dwg

MATCH LINE SHEET 1 / 2
MATCH LINE SHEET 1

MONITORING WELL / SOIL BORING / SAMPLE LOCATION MAP SOUTH

RIVERSIDE INDUSTRIAL PARK
SUPERFUND SITE
EPA ID: NJSFN0204232
TAX BLOCK 614

PPG INDUSTRIES, INC.
NEWARK, NEW JERSEY

JOB NO.:	013620
DATE:	05–16–16
SCALE:	1" = 30'
SHEET:	OF

FIGURE 6-2

Date: 09/01/2017	**MA:** xxxx.0	**Title:** ICP-MS Analysis of Soil/Sediment Plus Aluminum, Calcium, Iron, Magnesium, Potassium, and Sodium
Method Source: ISM02.4	**Method:** ICP-MS	
Matrix: Soil/Sediment		

Summary of Modification

The purpose of this modified analysis is to analyze soil/sediment samples by ICP-MS with the addition of the non-routine analytes Aluminum (Al), Calcium (Ca), Iron (Fe), Magnesium (Mg), Potassium (K), and Sodium (Na). Unless specifically modified by this modification, all analyses, Quality Control (QC), and reporting requirements specified in the SOW listed in your current EPA agreement remain unchanged and in full force and effect.

I. Analyte Modifications **Not applicable** ☐

Analyte	CAS Number	CRQL (mg/kg)
Aluminum (Al)	7429-90-5	10
Calcium (Ca)	7440-70-2	250
Iron (Fe)	7439-89-6	100
Magnesium (Mg)	7439-95-4	250
Potassium (K)	7440-09-7	250
Sodium (Na)	7440-23-5	250

II. Calibration and QC Requirements **Not applicable** ☐

The Laboratory shall:

- Determine Method Detection Limits (MDLs) for the additional analytes by the preparation and analysis methods used, unless values have been determined for those analytes by those methods within the last 12 months.
- Perform the Initial Calibration with at least one non-blank standard at or below the modified CRQLs, converted to µg/L as necessary.
- Add the additional analytes to the ICV and CCV at appropriate mid-range concentrations.
- Evaluate the ICB and CCB against the modified CRQLs converted to µg/L as necessary.
- Evaluate the Preparation Blanks using the modified CRQLs.
- Flag the Duplicates based on the modified CRQLs.
- Prepare the LCS at 2 times the appropriate modified CRQLs.

III. Preparation and Method Modifications **Not applicable** ☐

- It is highly recommended that a semi-quantitative analysis is completed using Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES) to screen for high element concentrations prior to ICP-MS analysis. Information gained from this may be used to prevent potential damage to the detector during sample analysis and to identify elements which may be higher than the calibrated range. The sample can also be screened for background levels of all elements chosen for use as internal standards in order to prevent bias in the calculation of analytical data. Undiluted sample results are not required if elements are present in the undiluted sample leachate at levels which could damage the detector.

IV. Special Reporting Requirements **Not applicable** ☐

The Laboratory shall:

- Ensure the SDG Narrative is updated as stated in the SOW, including any technical and administrative problems encountered and the resolution or corrective actions taken. These problems may include interference problems encountered during analysis, dilutions, re-analyses

and/or re-preparations performed, and problems with the analysis of samples. Also include a discussion of any SOW Modified Analyses, including a copy of the approved modification form with the SDG Narrative

- Add the additional analytes to Forms 1, 2, 3, 4, 5A (5B), 6, 7, 8, 9, 11, 12, 15, and 16.
- Report the "J" and "U" qualifiers in accordance with the requirements in Exhibit B, Section 3.4.2.2.5.2, using the modified CRQLs..